

Mathematical Models in Biology: Cancer Cells Growth with Chemotherapy Through Partial Differential Equations

by Atmini Dhoruri, Eminugroho Ratna Sari, Dwi Lestari

ABSTRACT

The spread of cancer cells with various modifications from the mathematical side needs to be carried out continuous research. Naturally, the body produces immune cells to fight cancer cells. The immune component in this study is CTL cells which are then activated into killer T cells and helper T cells. While chemotherapy is by giving drugs. However, it depends not only on time, but also on the age of cancer cells. Mathematically, the pattern of spread of cancer cells that depends on time and position can be modeled in the form of a system of partial differential equations. So the purpose of this study is to form a mathematical model of cancer cell growth that is not only dependent on time, but also age, then explains the biological interpretation of the mathematical model of the spread of cancer cells if treated with chemotherapy. Specifically, this research is a continuation of previous research, that the model formed was developed from a system of ordinary differential equations into a system of partial differential equations. From the system that was formed obtained a balanced solution and dynamic analysis of the behavior of cell spread with chemotherapy. From the analysis it is expected that the spread of cancer cells can be controlled by the rate of drug concentration in chemotherapy while maintaining immune cells.

Kata Kunci: *mathematical models, partial differential equation systems, cancer cells, chemotherapy*